

WHAT IS CLAIMED IS:

1. An upper spindle shaft, comprising:
 - an upper section;
 - a lower section; and,
 - an undercut section, located between said upper section and said lower section.
2. A spindle shaft set comprising the upper spindle shaft of claim 1,
 - said lower section comprising a threaded spindle shaft receptacle,
 - and further comprising
 - a probe pin having a first end and a second end distal to said first end that comprises
 - a probe knob with a support ledge at said first end and
 - probe threads vicinal to said second end,
 - said probe threads capable of being screwed into said threaded spindle shaft receptacle.
3. The spindle shaft set of claim 2,
 - said threaded spindle shaft receptacle comprising a receptacle end wall,
 - said probe pin further comprising a depth stop,
 - said depth stop extending from said probe threads to said second end of said probe pin, and
 - said second end of said probe pin contacting said receptacle end wall when said probe threads are screwed into said threaded spindle shaft receptacle.
4. A spindle assembly comprising the upper spindle shaft of claim 1,
 - and further comprising
 - a spindle comprising a spindle bore,
 - said upper spindle shaft capable of being inserted into said spindle bore.

5. The spindle assembly of claim 4,
further comprising a spindle stop connected with said upper spindle shaft,
said spindle stop capable of limiting axial motion of said upper spindle shaft
relative to said spindle when said upper spindle shaft is inserted into said spindle
bore.
6. The spindle assembly of claim 5,
further comprising,
a probe pin capable of being inserted into said spindle bore and
a shaft stop connected with said probe pin,
said shaft stop capable of limiting axial motion of said probe pin relative to
said spindle when said probe pin is inserted into said spindle bore, and
said probe pin capable of being connected with said upper spindle shaft.
7. The spindle assembly of claim 6,
said spindle being in contact with said upper spindle shaft and said probe pin
over less than about 50% of a length of said spindle bore, when said upper spindle
shaft and said probe pin are inserted into said spindle bore and said upper spindle
shaft and said probe pin are connected with each other.
8. The spindle assembly of claim 7,
said spindle being in contact with said upper spindle shaft and said probe pin
over less than about 30% of a length of said spindle bore, when said upper spindle
shaft and said probe pin are inserted into said spindle bore and said upper spindle
shaft and said probe pin are connected with each other.
9. The spindle assembly of claim 8,
said spindle being in contact with said upper spindle shaft and said probe pin
over from about 20% to about 25% of a length of said spindle bore, when said
upper spindle shaft and said probe pin are inserted into said spindle bore and said

upper spindle shaft and said probe pin are connected with each other.

10. The spindle assembly of claim 4, further comprising
a locking collar fixable to said upper spindle shaft.
11. The spindle assembly of claim 4,
said spindle comprising a spindle body and a nose.
12. The spindle assembly of claim 11,
said spindle body comprising a body bore, and
said spindle body being in contact with said upper section and said lower
section of said upper spindle shaft over less than about 60% of a length of said
body bore, when said upper spindle shaft is inserted into said body bore.
13. The spindle assembly of claim 12,
said spindle body being in contact with said upper section and said lower
section of said upper spindle shaft over less than about 45% of a length of said
body bore, when said upper spindle shaft is inserted into said body bore.
14. The spindle assembly of claim 13,
said spindle body being in contact with said upper section and said lower
section of said upper spindle shaft over about 40% of a length of said body bore,
when said upper spindle shaft is inserted into said body bore.
15. A probe pin, comprising:
a first end;
a second end distal to said first end;
a probe knob with a support ledge at said first end; and,
a depth stop.

16. The probe pin of claim 15, further comprising
probe threads vicinal to said second end,
said depth stop extending from said probe threads to said second end.
17. A spindle shaft set comprising the probe pin of claim 16,
and further comprising
an upper spindle shaft, comprising a threaded spindle shaft receptacle with a
receptacle end wall,
said probe threads capable of being screwed into said threaded spindle shaft
receptacle, and
said second end of said probe pin contacting said receptacle end wall when
said probe threads are screwed into said threaded spindle shaft receptacle.
18. The spindle shaft set of claim 17,
said upper spindle shaft further comprising
an upper section,
a lower section, and
an undercut section located between said upper section and said lower
section.
19. A spindle assembly comprising the spindle shaft set of claim 17,
and further comprising:
a spindle comprising a spindle bore;
said probe pin and said upper spindle shaft capable of being inserted into said
spindle bore.
20. The spindle assembly of claim 19,
further comprising a spindle stop connected with said upper spindle shaft,
said spindle stop capable of limiting axial motion of said upper spindle shaft
relative to said spindle when said upper spindle shaft is inserted into said spindle

bore.

21. The spindle assembly of claim 19, further comprising
a locking collar capable of being affixed to said upper spindle shaft and
capable of limiting axial motion of said upper spindle shaft relative to said
spindle when said upper spindle shaft is inserted into said spindle bore.
22. The spindle assembly of claim 19:
said spindle comprising a spindle body and a nose;
said spindle body comprising a threaded body receptacle;
said nose comprising nose threads; and,
said nose threads capable of being screwed into said threaded body
receptacle.
23. The spindle assembly of claim 22,
said nose threads being of an opposite handedness than said probe threads.
24. A spindle assembly comprising the probe pin of claim 16,
and further comprising:
an upper spindle shaft, comprising an upper section, a lower section, and an
undercut section, said undercut section located between said upper section and
said lower section;
said lower section of said upper spindle shaft further comprising a threaded
spindle shaft receptacle with a receptacle end wall, said probe threads capable of
being screwed into said threaded spindle shaft receptacle, and said second end of
said probe pin contacting said receptacle end wall when said probe threads are
screwed into said threaded spindle shaft receptacle;
a spindle comprising a spindle bore, said probe pin and said upper spindle
shaft capable of being inserted into said spindle bore; and,
a locking collar capable of being affixed to said upper spindle shaft.

25. The spindle assembly of claim 24:
- said spindle comprising a spindle body and a nose;
 - said spindle body comprising a threaded body receptacle;
 - said nose comprising nose threads;
 - said nose threads capable of being screwed into said threaded body receptacle; and,
 - said nose threads being of an opposite handedness than said probe threads.
26. A method for assembling a spindle assembly, comprising the steps of:
- providing an upper spindle shaft, comprising an upper section, a lower section, and an undercut section;
 - providing a spindle comprising a spindle bore; and,
 - inserting said upper spindle shaft into said spindle bore.
27. The method of claim 26, further comprising the steps of:
- providing a locking collar; and,
 - affixing said locking collar to said upper spindle shaft.
28. The method of claim 26, further comprising the steps of:
- providing a spindle body comprising a threaded body receptacle;
 - providing a nose comprising nose threads; and,
 - screwing said nose threads into said threaded body receptacle to form said spindle.
29. A method for assembling a spindle assembly, comprising the steps of:
- providing a probe pin comprising a probe knob with a support ledge at a first end, probe threads vicinal to a second end distal to said first end, and a depth stop

extending from said probe threads to said second end;
providing an upper spindle shaft comprising a threaded spindle shaft receptacle with a receptacle end wall;
providing a spindle comprising a spindle bore;
inserting said probe pin and said upper spindle shaft into said spindle bore;
and,
screwing said probe threads into said threaded spindle shaft receptacle.

30. The method of claim 29, further comprising the steps of:
providing a locking collar comprising a collar bore; and,
affixing said locking collar to said upper spindle shaft.
31. The method of claim 30, wherein said providing a spindle comprises
providing a spindle body;
providing a nose;
connecting said nose with said spindle body to form said spindle.
32. The method of claim 30, further comprising the steps of:
providing a positioning jig comprising a support shoulder and an insertion pin connected with said support shoulder;
inserting said insertion pin into said collar bore of said locking collar so that said support shoulder contacts said locking collar; and,
inserting said upper spindle shaft into said collar bore so that said upper spindle shaft contacts said insertion pin.